AMENDMENTS TO THE CLAIMS

Claims 1-51 (canceled)

52. (Original) A thermal cycler comprising

a processing unit having an opening to receive a sample vessel containing a sample, the processing unit having a first processing station, a second processing station, and a third processing station positioned along the opening,

the first processing station including a first compression member adapted to compress the sample vessel within the opening and a first energy transfer element for transferring energy to the sample at the first processing station,

the second processing station including a second compression member adapted to compress the sample vessel within the opening and a second energy transfer element for transferring energy to the sample at the second processing station, and

the third processing station including a third compression member adapted to compress the sample vessel within the opening and a third energy transfer element for transferring energy to the sample at the third processing station, wherein compression of the sample vessel by of one of the compression members displaces the sample within the sample vessel between the processing stations.

53. (Previously presented) The thermal cycler of claim 52, further comprising at least one sensor for detecting a signal from the content within the sample vessel.

54. (Previously presented) The thermal cycler of claim 53, wherein the sensor comprises an optical sensor for measuring light signal from the contents with the sample vessel.

55. (Previously presented) The thermal cycler of claim 54, wherein the light signal comprises fluorescent light.

56. (Previously presented) The thermal cycler of claim 53, wherein the sensor monitors the signal from the content within the sample vessel in real time.

57. (Previously presented) A thermal cycler comprising

a processing unit having an opening to receive a sample vessel containing a sample, the processing unit having a first processing station and a second processing station positioned along the opening,

the first processing station including a first compression member adapted to compress the sample vessel within the opening and a first energy transfer element for transferring energy to the sample at the first processing station, and

the second processing station including a second compression member adapted to compress the sample vessel within the opening and a second energy transfer element for transferring energy to the sample at the second processing station, wherein compression of the sample vessel by of one of the compression members displaces the sample within the sample vessel between the processing stations.

58. (Previously presented) The thermal cycler of claim 57, further comprising at least one sensor for detecting a signal from the content within the sample vessel.

59. (Previously presented) The thermal cycler of claim 58, wherein the sensor comprises an optical sensor for measuring light signal from the contents with the sample vessel.

60. (Previously presented) The thermal cycler of claim 59, wherein the light signal comprises fluorescent light.

61. (Previously presented) The thermal cycler of claim 58, wherein the sensor monitors the signal from the content within the sample vessel in real time.

Claims 62-65 (canceled)

66. (New) The thermal cycler of claim 52, further comprising at least one energy insulator positioned adjacent at least one processing station.

67. (New) The thermal cycler of claim 52, wherein at least one of the the energy transfer elements comprises at least one of an electronic heat element, a microwave source, a light source, an ultrasonic source and a cooling element.

68. (New) The thermal cycler of claim 52, further comprising a control system coupled to at least one energy transfer element to control the energy transferred to or from that energy transfer element.

69. (New) The thermal cycler of claim 68, further comprising a temperature sensor coupled to the control system.

70. (New) The thermal cycler of claim 52, wherein at least one processing station further comprises a heat sink.

71. (New) The thermal cycler of claim 52, wherein at least one processing station includes a stationary member opposing the respective compression member across the opening, wherein the respective compression member compresses the sample vessel against the stationary member within the opening.

72. (New) The thermal cycler of claim 52, further comprising a driver coupled to at least one compression member to selectively move that compression member and thereby compress the sample vessel within the opening.

73. (New) The thermal cycler of claim 72, wherein the driver is a motor and is coupled to the at least one compression member by a cam.

74. (New) The thermal cycler of claim 72, wherein the driver is an electromagnetic actuating mechanism.

75. (New) The thermal cycler of claim 52, further comprising an energy source for applying energy to at the sample within the sample vessel to generate a signal from the sample.

76. (New) The thermal cycler of claim 52, further comprising an electrophoresis system comprising a pair of electrodes adapted to have a predetermined voltage difference and an electrode actuator for inserting the electrodes into the sample vessel.

77. (New) The thermal cycler of claim 52, further comprising a reagent injector cartridge actuator adapted to receive a reagent injector cartridge having at least one needle in fluid communication with a reagent reservoir, the reagent injector cartridge actuator operable to move the reagent injector cartridge to inject a quantity of reagent into the sample vessel.

78. (New) The thermal cycler of claim 52, wherein compression of the sample vessel by one of the compression members displaces a reagent within the sample vessel between the processing stations.

79. (New) A method of thermal cycling, comprising:
adding a sample to a sample vessel;
introducing the sample vessel into a thermal cycler as set forth in claim 52;
compressing the sample vessel with the first compression member to move the sample within the sample vessel from the first processing station to the second processing station;
transferring energy to the sample at the second processing station;
compressing the sample vessel with the second compression member; and
transferring energy to the sample at the first processing station.

80. (New) The method of claim 79, further comprising adding a reagent to the sample in the sample vessel.

81. (New) The method of claim 79, further comprising heating the sample in the first processing unit to a first temperature.

82. (New) The method of claim 81, further comprising heating the sample in the second processing unit to a second temperature.

83. (New) The method of claim 82, wherein the first temperature is effective to denature nucleic acid in the sample and the second temperature is one at which nucleic acid annealing and nucleic acid synthesis can occur.

84. (New) The method of claim 79, further comprising analyzing the sample by detecting a signal from the sample, and analyzing the detected signal to determine a condition of the sample.

85. (New) The method of claim 84, wherein analyzing further comprises applying an excitation energy to the sample.

86. (New) The method of claim 79, further comprising conducting electrophoresis analysis of the sample by:

applying a selective voltage to the sample;

detecting light emitted from the sample; and

analyzing the detected light to determine a condition of the sample.

87. (New) The method of claim 79, further comprising:

applying an excitation energy to a bio-array member contained within the sample vessel;

detecting light emitted from the bio-array member; and

analyzing the detected light to determine a condition of the sample.

88. (New) The method of claim 79, further comprising agitating the sample within the sample vessel.

89. (New) A method of thermal cycling, comprising:
adding a sample to a sample vessel;
introducing the sample vessel into a thermal cycler as set forth in claim 52;
compressing the sample vessel with the first compression member;
transferring energy to the sample with the second energy transfer element;
compressing the sample vessel with the second compression member;
transferring energy to the sample with the third energy transfer element;
compressing the sample vessel with the third compression member; and
transferring energy to the sample with the first energy transfer element.

90. (New) The method of claim 89, further comprising agitating the sample within the sample vessel.

91. (New) The method of claim 89, further comprising heating the sample in the first processing unit to a first temperature.

92. (New) The method of claim 91, further comprising heating the sample in the second processing unit to a second temperature.

93. (New) The method of claim 92, further comprising heating the sample in the third processing unit to a third temperature.

94. (New) The method of claim 93, wherein the first temperature is effective to denature nucleic acid in the sample, the second temperature is one at which nucleic acid annealing can occur, and the third temperature is one at which nucleic acid synthesis can occur.

95. (New) A method of thermal cycling, comprising:
adding a sample to a sample vessel;
introducing the sample vessel into a thermal cycler as set forth in claim 57;
compressing the sample vessel with the first compression member to move the sample within the sample vessel from the first processing station to the second processing station;
transferring energy to the sample at the second processing station;
compressing the sample vessel with the second compression member; and
transferring energy to the sample at the first processing station.

96. (New) The method of claim 95, further comprising adding a reagent to the sample in the sample vessel.

97. (New) The method of claim 96, further comprising heating the sample in the first processing unit to a first temperature.

98. (New) The method of claim 97, further comprising heating the sample in the second processing unit to a second temperature.

99. (New) The method of claim 98, wherein the first temperature is effective to denature nucleic acid in the sample and the second temperature is one at which nucleic acid annealing and nucleic acid synthesis can occur.

100. (New) The method of claim 95, further comprising analyzing the sample by detecting a signal from the sample, and analyzing the detected signal to determine a condition of the sample.

101. (New) The method of claim 100, wherein analyzing further comprises applying an excitation energy to the sample.

102. (New) The method of claim 95, further comprising conducting electrophoresis analysis of the sample by:

applying a selective voltage to the sample;

detecting light emitted from the sample; and

analyzing the detected light to determine a condition of the sample.

103. (New) The method of claim 95, further comprising:

applying an excitation energy to a bio-array member contained within the sample vessel;

detecting light emitted from the bio-array member; and

analyzing the detected light to determine a condition of the sample.

104. (New) The method of claim 95, further comprising agitating the sample within the sample vessel.